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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/083,017

02/26/2002

Douglas Alan Miller

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4317

7590

05/13/2004

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EXAMINER

JACOBSON, TONY M

ART UNIT

PAPER NUMBER

2644

DATE MAILED: 05/13/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/083,017

Applicant(s)

MILLER ET AL.

Examiner

Tony M Jacobson

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 January 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5,7-12,15-18 and 37-45 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5,7-12,15-18 and 37-45 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 February 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-3, 10-12, 15, 37-39, and 42-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Leysieffer (US 6,554,762) in view of Hochmair et al. (US 4,577,641).

3. Regarding claims 1 and 37, Leysieffer discloses in Fig. 1, an implantable hearing aid (12) with means for measuring its coupling quality (a system for assessing the performance of a hearing aid that includes an implanted actuator), which comprise a test device (programming system 22 in combination with implanted hearing aid 12) having a signal generator (DSP 13) to generate a test signal at a predetermined frequency, wherein the hearing aid passes at least one electrical signal through the hearing aid actuator (16) in response to the test signal; a measurement device (impedance measuring system 25 – see column 14, lines 33-36) for obtaining at least one test measure of the electrical signal passing through the hearing aid; and a signal processing unit (13) to process the at least one test measure and provide an output usable to assess the performance of the hearing aid (column 16, lines 36-40). The inherent normal method of testing the quality of the coupling of the actuator a

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component of a patient's auditory system according to the system of Leysieffer would comprise positioning a test measurement device (element 22 of Fig. 1) external to a patient having an implanted hearing aid that includes an actuator; utilizing the test device to generate at least one predetermined test signal that is provided by the test device to the hearing aid and to obtain at least one test measure of an electrical signal passing through the actuator in response to the test signal (column 14, lines 44-48 and claim 13); and employing the at least one test measure to assess at least one performance parameter of the hearing aid (claim 1). Leysieffer does not disclose that the test measurement device that generates the test signal at a predetermined frequency is (completely) separate from and positioned external to a patient having the implanted hearing aid. Hochmair et al. discloses in Fig. 1, a method of fitting a hearing aid (such as cochlear implant or a conventional hearing aid), in which a test measurement device that is separate from and positionable external to a patient having an implanted hearing aid generates a plurality of predetermined test signals that are transmitted to an implanted transducer (see column 3, line 14 –column 4, line 5). This method of applying test signals to a hearing aid from an external test device (either through a transcutaneous transmitter/receiver arrangement or through a loudspeaker projecting acoustic waves to a microphone of the hearing aid, as described at column 3, lines 41-43) has long been well known in the art. It would have been obvious to one of ordinary skill in the art at the time the present invention was made to generate the audio test signal in the programming system (22) of Leysieffer, external to the hearing aid and the patient, as taught by Hochmair et al., in order to simplify the programming of the

DSP (13) of the implanted hearing aid of Leysieffer, and/or in order to avoid the prior art.

4. Regarding claims 2, 3, 38, and 39, Leysieffer discloses at column 6, lines 46-63 that means are provided for objectively determining the quality of coupling between the output transducer (actuator) and the coupled auditory element based on the measured impedance (test measure). Objective determination based on measured quantities inherently comprises comparing the measured quantities to a one or more predetermined ranges to assess one or more performance parameters. Leysieffer discloses at column 13, line 66 through column 14, line 7 that the microcontroller (17) of the implanted hearing aid communicates bi-directionally through the closed skin with an external programming system (22), which can advantageously be a PC-based system with the corresponding programming, processing, display, and administration software. Although Leysieffer does not explicitly disclose the detailed nature of the output provided to the operator of the system, one of ordinary skill in the art would conclude that means are included within the programming system (a signal processor) to provide a user-interface output, via a display of the PC-based programming system, indicative of performance parameters. Since the disclosed inventive feature of the test apparatus of Leysieffer is measuring the quality of coupling between an actuator of an implanted hearing aid and the coupled auditory component of the patient's ear, and Leysieffer discloses at column 6, line 54 –column 7, line 7 that the coupling quality can be judged and, if necessary, improved through use of the system, the method inherently comprises comparing the impedance measure to a first predetermined range to assess

an interface between the hearing aid actuator and a component of an auditory system of the patient.

5. Regarding claims 10 and 42, as broadly as claimed, any test signal has a frequency that is within some (predetermined) range of a resonant frequency of an actuator. Additionally, Leysieffer discloses at column 8, lines 23-29 that impedance is measured at resonance frequencies, which inherently requires providing test signals at those resonant frequencies.

6. Regarding claim 11, Leysieffer discloses in Fig. 11, an alternate embodiment in which a passive electronic module (77) and actuator (16) are implanted within a patient and an external unit (76) comprises a microphone (10), signal processing module (74), battery (3), and modulator/transmitter (75). Leysieffer discloses at column 21, lines 9-13 that the implanted electronic module (77) and the modulator/transmitter unit (75) include the necessary telemetry unit for transmission of the impedance measuring data to the external module (76) for further evaluation, but does not disclose specifically how the impedance measurement data is further evaluated or utilized. According to the general teachings of Leysieffer, as in the embodiment of Figs. 1, 6, and 7, it would have been obvious to one of ordinary skill in the art at the time the present invention was made to selectively interconnect programming system (22) (the test measurement device) to the external transmitter (76 of Fig. 11) of the hearing aid, transmitting the at least one predetermined test signal from the test measurement device (programming

system 22) to the external transmitter (76), according to the teachings of Hochmair et al. as described above regarding claim 1; and inductively coupling the at least one test signal between the external transmitter and a subcutaneous coil of the hearing aid.

7. Regarding claim 12, Hochmair et al. discloses at column 3, lines 41-43 that if a hearing aid (as opposed to a cochlear implant) has to be checked, the test signal is applied to the patient wearing the aid via a loudspeaker. It would have been obvious to one of ordinary skill in the art at the time the present invention was made to apply this further teaching to the implanted hearing aid system of Leysieffer by transmitting the at least one predetermined test signal to a speaker located external to the patient, wherein the at least one predetermined test signal is acoustically provided by the speaker to an implanted microphone of the hearing aid in order to conveniently couple a test signal into the hearing aid using the existing microphone.

8. Regarding claim 15, Leysieffer discloses at column 6, lines 54-62 that if the coupling quality of the output transducer (actuator) is judged inadequate, it can be improved. One of ordinary skill in the art would conclude that such improvement would be achieved by repositioning the actuator to achieve a desirable interface.

9. Regarding claims 43 and 44, Leysieffer discloses at column 8, lines 1-17 that impedance measurements are made (test measures are obtained) at frequencies extending over the entire transmission frequency range of the output transducer

(actuator), which inherently requires providing a plurality of predetermined test signals having different frequencies distributed across a predetermined frequency range for use in generating a corresponding plurality of electrical signals passing through the actuator and using the test measurement device to obtain a plurality of test measures corresponding to the plurality of electrical signals passing through the actuator.

10. Regarding claim 45, the signal generators taught by both Leysieffer and Hochmair et al. comprise an oscillator (a device for producing an alternating current, inherently) for generating at least one predetermined test signal; a test control processor to set the oscillator to generate the test signal (microcontroller 17 of Leysieffer, computer 10 of Hochmair et al.); and a reference transmitter to provide the at least one test signal to one of a speaker (column 3, lines 32-43 of Hochmair et al.) and an external transmitter of the hearing aid (inherently part of programming system 22 of Fig. 1 of Leysieffer; also, see column 2, lines 49-53 of Hochmair et al.).

11. Claims 4, 5, 7-9, 40, and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Leysieffer (US 6,554,762) in view of Hochmair et al. (US 4,577,641) as applied to claims 2 and 38 above, and further in view of Hayashi et al. (JP 60216695 A) and Urano (JP 07239993 A).

12. Regarding claims 4, 5, 40, and 41, Leysieffer discloses at column 6, lines 46-63 that means are provided for objectively determining the quality of coupling between the

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output transducer (actuator) and the coupled auditory element based on the measured impedance (test measure). Objective determination based on measured quantities inherently comprises comparing the measured quantities to a one or more predetermined ranges. Leysieffer does not explicitly disclose comparing the at least one impedance measure to a second predetermined range to assess the operability of the hearing aid, wherein the second predetermined range is at least partially non-overlapping with a first predetermined range used to assess an interface between the hearing aid actuator and a component of an auditory system of the patient. Hayashi et al. discloses a device and associated method for testing an acoustic actuator (a loudspeaker) by measuring the impedance of the actuator in response to AC test signals passing through the actuator and comparing a resultant impedance measure to a predetermined value or range of values to provide an output indicating the condition of the actuator (see English abstract). Urano discloses a similar testing device for measuring the impedance of an acoustic actuator (a loudspeaker) in response to an AC signal, comparing the measured impedance to a predetermined range to determine if the actuator is operable (not open circuited or short circuited), and providing an output indicative of whether the impedance measure is within the predetermined range (see English abstract). It would have been obvious to one of ordinary skill in the art at the time the present invention was made to apply the teachings of Hayashi et al. and Urano to the system and method of Leysieffer, modified according to the teachings of Hochmair et al. by comparing the measured impedance value (test measure) obtained with a second predetermined range (which would inherently be at least partially non-

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overlapping with a range used to determine a proper interface between the actuator and an auditory component of a patient), utilizing appropriate means such as the signal processing unit, and providing an output through the user interface, indicative of whether the actuator test measure is within a second predetermined range, in order to easily determine if the implanted actuator is functional.

13. Regarding claims 7 and 8, Leysieffer discloses at column 8, lines 1-17 that impedance measurements are made (test measures are obtained) at frequencies extending over the entire transmission frequency range of the output transducer (actuator), which inherently requires providing a plurality of predetermined test signals for use in causing a corresponding plurality of electrical signals passing through the actuator, wherein the plurality of predetermined test signals are at a corresponding plurality of different frequencies distributed across a predetermined frequency range; and utilizing the test device to obtain a plurality of test measures corresponding to the plurality of electrical signals passing through the actuator.

14. Regarding claim 9, Leysieffer discloses at column 8, lines 23-31, means for detecting (and thus identifying) the spectral distribution of resonance frequencies of the transducer in the course of the impedance measured as a function of the frequency of the stimulation signal.

Double Patenting

15. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

16. Claims 16-18 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 12, 13, and 17 of U.S. Patent No. 6,712,754. Although the conflicting claims are not identical, they are not patentably distinct from each other because claim 16 is an obvious variation of claim 17 in the issued patent. .

17. Claim 16 is rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 17 of U.S. Patent No. 6,712,754 in view of Hochmair et al. (US 4,577,641) as applied to the claims above. Claim 17 of the issued patent (comprising the limitations of claims 11 and 16) comprises explicitly all the limitations of claim 16 in the instant application except the at least one test signal being

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provided to the implanted hearing aid by a test device that is separate from the hearing aid and positioned external to a patient (claim 1) and comparing the at least one test measure to a first predetermined range to assess an interface between the hearing aid actuator and an auditory system of the patient (claim 2). Determining a status of an interface between the implanted actuator and the component of the auditory system by obtaining at least one test measure of the actuator responsive to an electrical signal passing through the actuator and employing the at least one test measure to determine the status of the interface, as claimed in claim 16 of the issued patent, inherently comprises comparing the at least one test measure to a first predetermined range. The use of a separate test device separate from the hearing aid and external to a patient to generate at least one predetermined test signal and provide said signal to the hearing aid is taught by Hochmair et al., as described above regarding claim 1. Thus, the invention claimed in instant claim 16 is an obvious variation of claim 17 in the issued patent in view of the prior art.

18. Claims 17 and 18 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 12, 13, and 17 of U.S. Patent No. 6,712,754 in view of Hochmair et al. (US 4,577,641) as applied to the claims above. Claim 17 adds to claim 16 the limitation of providing the electrical input to the positioning system by providing a wireless signal to the positioning system from a position external to the patient. Claim 12 of the issued patent recites: "...providing the electrical inputs to the positioning system in response to a transcutaneously transmitted

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wireless signal". The obvious combination of claims 12 and 17 of the issued patent renders instant claim 17 obvious in view of the prior art by the same reasoning applied to claim 16 above. Similarly, claim 18 adds to claim 16 the limitation of providing the electrical input to the positioning system by inductively coupling the electrical input to the positioning system, which is rendered obvious by the combination of claims 13 of the issued patent, which recites: "... inductively coupling the electrical inputs to the positioning system", and claim 17 of the issued patent in view of the prior art (Hochmair et al.).

Response to Arguments

19. Applicant's arguments with respect to claims 1-18 have been considered but are moot in view of the new ground(s) of rejection.

20. The inclusion of Leysieffer (US 6,077,215) in the statement of the basis of rejection of claims 4-12, 14, 15, 21, 26-28, 35, and 36 in the previous Office action was in error. The rejections were to be based solely on Leysieffer (US 6,554,762). The examiner apologizes for any confusion that may have been caused by such inclusion.

Conclusion

21. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

22. Leysieffer (US 6,077,215) discloses a system and method for coupling an implanted hearing aid transducer to the auditory system of a patient using a manually-adjustable positioning system.

23. Bartz (US 3,752,939) discloses an implanted hearing aid (a cochlear electrode implant system), which receives signals transcutaneously from an external unit comprising a microphone, oscillator/transmitter, and transmitting antenna in use. The disclosure implies an external test apparatus generates signals and transmits them to the hearing aid during the implantation process (see column 9, lines 21-41).

24. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

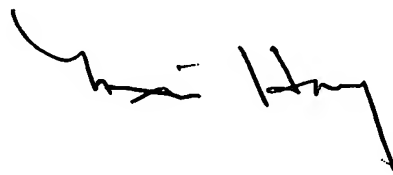
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tony M Jacobson whose telephone number is 703-305-5532. The examiner can normally be reached on M-F 11:00-7:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Forester W Isen can be reached on 703-305-4386. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

tmj
May 4, 2004



**MINSUN OH HARVEY
PRIMARY EXAMINER**